

The Oil Drum: Campfire

Discussions about Energy and Our Future

Peak Oil, Peak Credit and Investments - "So What the Hell Does One Do"?

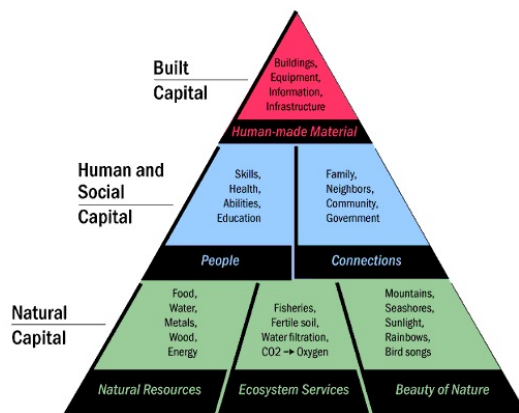
Posted by [Nate Hagens](#) on August 31, 2009 - 10:30am in [The Oil Drum: Campfire](#)

Topic: [Sociology/Psychology](#)

Tags: [built capital](#), [capital asset pricing model](#), [capm](#), [e.f. schumacher](#), [efficient frontier](#), [hedonic treadmill](#), [human capital](#), [investment](#), [natural capital](#), [risk adjusted return](#), [social capital](#) [[list all tags](#)]

(*Note: This posting was delayed due to the discovery that the mushrooms in the woods adjoining my parents cottage were [black trumpets](#). 4 hours, 5 lbs of mushrooms, and some soaking wet clothes later, here, on my [4 year anniversary](#) of being a member of this website, is tonight's Campfire...;-)

A common theme in conversations of the peak oil/limits to growth aware is 'What do I do'? Just slightly less common is 'What do I do with my money?' The biggest difficulty in contemplating/deciding/acting towards a new paradigm is one does this while the old paradigm is still going strong, if only on the surface and the media. In a temporary departure from usual Campfire topics, tonight's discussion will revolve around the concept of investments, and the coming transition from the old finance based rules into new undefined territory.



The Four (non-financial) Capitals - Natural, Social, Human, and Built - ([description](#))

I got this email yesterday:

To:Nate Hagens
Subject: So What the Hell Does One Do?
Date: Aug 27, 2009

Nate,

I read your work in various venues and appreciate the thought that goes in it. I have been peak oil aware for too many years, made some money, kept it and yet was too early. What the hell does one do now? Specifically:

Any thoughts on farmland? Farm income is going down, but I am looking at buying a good chunk - the offer is on my desk and as I am a broker I can buy it at wholesale - but will the odds of the land going down in monetary value be greater than the odds of it going up?

I see the worst case scenario that I lose half my invested wealth in farmland, I see the best case scenario that I lose half my wealth invested in farmland and keep the rest at break-even.

Yeah, free advice is what it's worth I guess. But it is becoming exhausting trying to win

this game. And, if truth be known, I really don't want to go live on a farm, sit on metaphorical beans, bullets, and band aids; but as a retired doctor doing public medicine I also see a huge part of our society that just won't be able to cope post peak - and part of that society is the doctors in private practice.

Damn, I did everything right for retirement, actually made it there and now this little inconvenience of peak oil comes along...

Pat

(Name and some words changed/deleted to protect anonymity)

I rarely give investment advice, except to my closest friends and family. Clearly there are logical market neutral themes that should prove advantageous over time to those who primarily care about such goals. For example, long the low cost, low externality energy companies vs. short the companies making non-essential goods, long the companies that focus on top 10% of social demographic vs short companies that rely on general consumer, etc. However, other than needing to really understand someones objectives on risk, return, time frame, etc., I have stopped giving investment advice for other reasons.

Firstly, I increasingly believe that a) the tertiary wealth markers (stocks, bonds, derivatives, etc.) have decoupled so fantastically from primary (energy, forests, materials, metals) and secondary (gasoline, lumber, tractors, blankets) wealth and b) the tertiary wealth markers due to excessive credit/debt/leverage are becoming more and more correlated to eachother, evidencing massive systemic risk and c) the receding tide of cheap energy, cheap credit, and available leverage will leave behind a social stratification so extreme that governments will increasingly have to change the rules of the game -on the fly- to appease the various disenfranchised. In other words, following fundamental macro based analysis will be increasingly akin to betting on a match of Jai Alai. (You can bet on Jai Alai but its 50/50 whether you are choosing the side rigged to win). I suspect the standard portfolio manager model of 'dollar average on dips', 'stocks return 10% on average over the long run', 'some new technology will cause DJIA to be at 30,000 in 10 years', etc. is finished, though a majority of the players don't yet realize it. *(the concept of differentiating primary, secondary and tertiary wealth was detailed in E.F.Schumachers [Small is Beautiful](#), but has origins as far back as Frederick Soddy's [Wealth, Virtual Wealth, and Debt](#), in 1926. It remains a central tenet of [Ecological Economics](#))*

My second reason is more personal - the whole investment business is becoming a bit obscene, irrespective of whether one wins or loses, and I have decided (for myself) I've spent too much of my finite life on something with little lasting meaning. I suppose dealing with 80+ year old billionaires who never spent a penny but screamed at me when their \$5 million monthly Treasury coupons didn't transfer to their banks on time gave me an early clue.

As such, let me approach this readers question from a different angle....

Why do we invest?

Wealth - any income that is at least one hundred dollars more a year than the income of one's wife's sister's husband.

H. L. Mencken

We are genetically wired to respond to cultural cues to move up the mating ladder, as opposed to down. Theories of [sexual selection](#), [relative fitness](#), etc. are robust in the animal kingdom and humans differ only in their expression of what constitutes successful competition during different socio-economic eras. Our culture currently measures status many different ways - respect, reputation, intelligence, publication, accomplishment, notoriety, etc.

However, pecuniary wealth has, at least in the last two hundred or so years, functioned as a shortcut for moving up the social status ladder. In short, investing in financial assets has been one avenue open to jumping up a few notches on the social status ladder, not to mention the other fun and novel experiences it enables. Once obtained, paper assets widens the spigot of neurotransmitter cocktails matching the sensations our ancestors experienced as they themselves became successful at opportunities involving acquiring resources, mating and reproducing. In sum, making money is promoted by our culture, and it feels good. Losing money, or having no money versus our conspecifics, (especially if we used to), feels bad...;-)

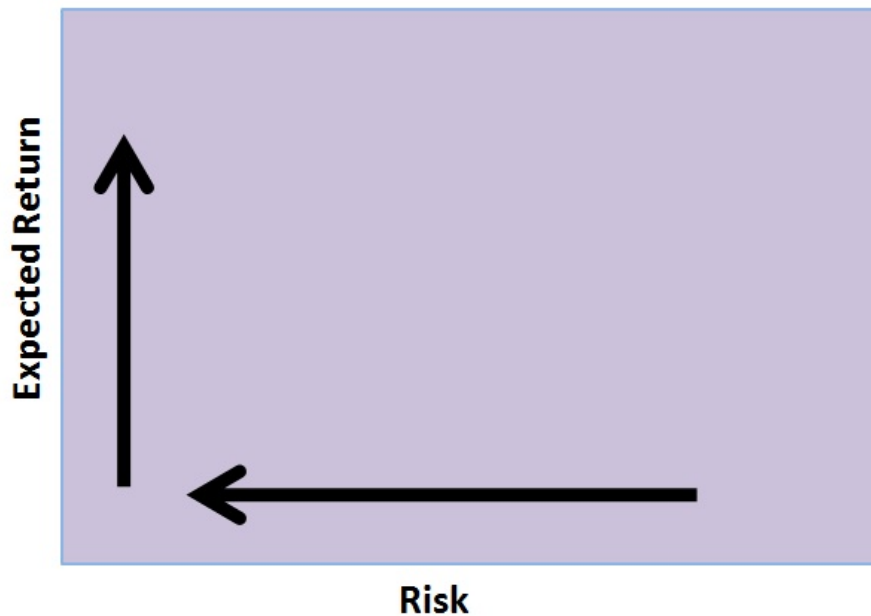
Why do we care about risk and diversification?

Kacelnik A, Bateson M 1996. **Risky Theories - The Effects of Variance on Foraging Decisions**

American Zoologist 36 (4): 402-434. Here's the abstract:

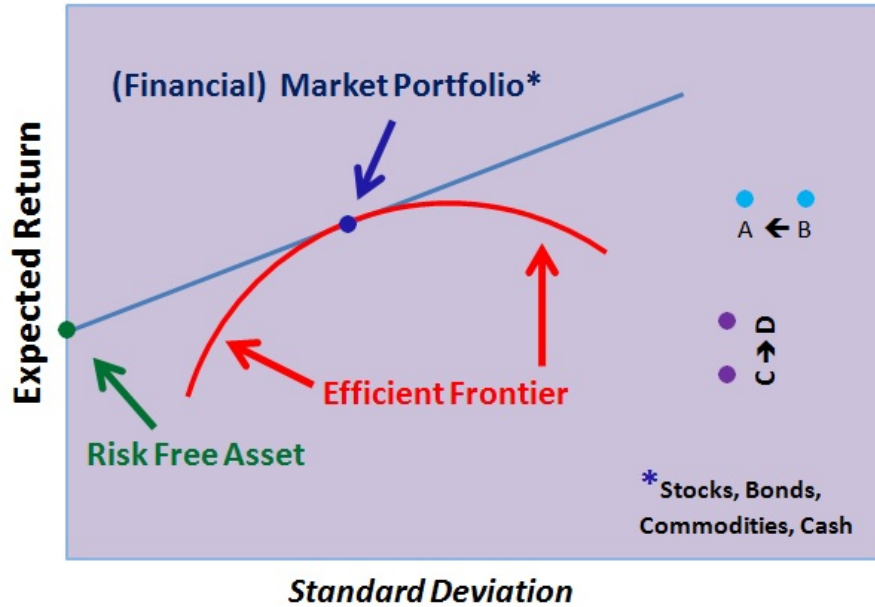
This paper concerns the response of foraging animals to variability in rate of gain, or risk. Both the empirical and theoretical literatures relevant to this issue are reviewed. The methodology and results from fifty-nine studies in which animals are required to choose between foraging options differing in the variances in the rate of gain available are tabulated. We found that when risk is generated by variability in the amount of reward, animals are most frequently risk-averse and sometimes indifferent to risk, although in some studies preference depends on energy budget. In contrast, when variability is in delay to reward, animals are universally risk-prone. A range of functional, descriptive and mechanistic accounts for these findings is described, none of which alone is capable of accommodating all aspects of the data. Risk-sensitive foraging theory provides the only currently available explanation for why energy budget should affect preference.

In essence we prefer the highest return per unit time, adjusted by its risk (measured in financial assets by standard deviation).



Basically, in the above graphic, we will prefer opportunities, (ceteris paribus) that move right to left (less risk) and move bottom to top (more reward). (In animals, 'reward' is measured primarily by calories (energy). However in humans, the only species to (significantly) use exosomatic energy (the average american consumes almost 240,000 calories daily - only about 3,000 via food -the rest on transportation, entertainment, waste, etc. (1). It is our desires, our infrastructure, our marketing, and our social cues that dictate the exogenous (out of body) energy 'needs'.)

Let's take a look at boilerplate business school finance - the Capital Asset Pricing Model and Efficient Frontier -the foundations of asset allocation and investing.

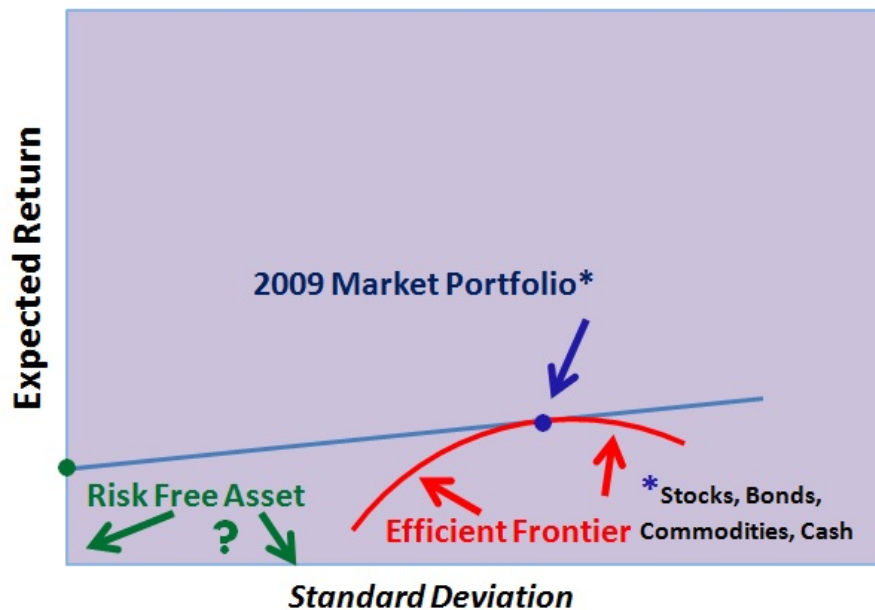


Capital Asset Pricing Model and Efficient Frontier

In the above graphic, imagine hundreds or even thousands of points below the blue line as investable (financial) assets. The green dot represents Treasury bills - a smallish return, but zero risk. To get a higher return, we must move from left to right on the graph, taking on incrementally higher risk. An investor will always prefer Asset A to Asset B, because for the same return, A has less risk. Similarly, an investor will always prefer Asset D over Asset C as for the same risk, D has a higher return.

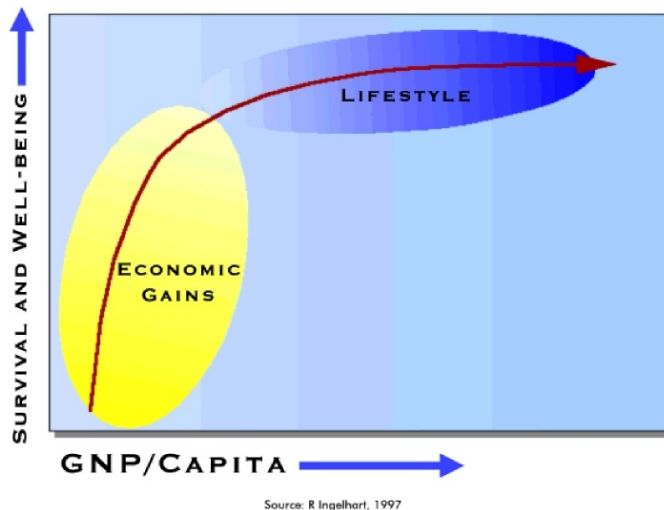
The risk of a portfolio includes systematic risk, (considered undiversifiable), and unsystematic risk (or diversifiable risk). Systematic risk refers to the risk common to all risky securities - i.e. market risk. Unsystematic risk is the risk associated with individual assets and can be reduced by including a greater number of assets in a portfolio. The CAPM assumes that the risk-return profile of a portfolio can be optimized -i.e. the lowest possible amount of risk for the chosen level of return. This occurs by adding uncorrelated assets into a portfolio. All such optimal portfolios, i.e., one for each level of return, make up what is called the *efficient frontier* (shown in red). A rational investor should not take on any diversifiable risk, as only non-diversifiable risks are rewarded.

Other than some statistics and top notch job interviews, you just saved 80k in tuition for MBA school...;-)

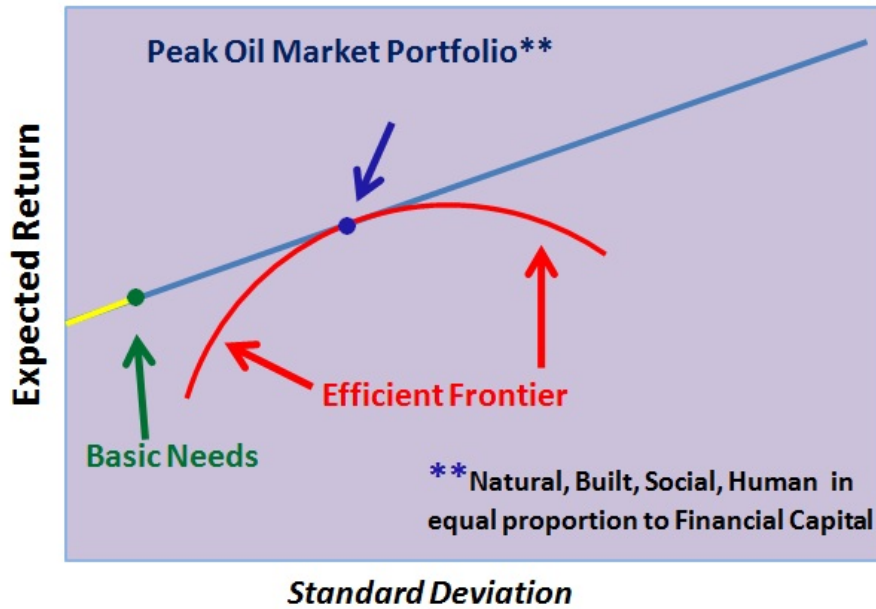


The problem of exponential growth against a finite resource base has manifested in an orgy of tertiary market wealth creation (and in so doing, sending a false signal through the socio-economic system that energy supply was being increased on its own merits). We don't really know how far removed 2,000 trillion of claims on 55 trillion of global GDP, itself heavily financially skewed, is from the reality of primary (natural resource) wealth (2). I suspect it is greater than an order of magnitude, but it might be less, if there is a high degree of notional offsettables. But derivatives and other contracts notwithstanding, we have north of \$200 trillion of *money as debt* circulating worldwide, all in need of servicing. At some point, and I will argue in upcoming analyses, this point is now, the debt becomes unserviceable. In other words, what we think of as wealth, at least many of us, and much of it, is not. The interesting aspect is that although the debt will never be able to be serviced, the *perception* that it will be serviced is still with us.

The Capital Asset Pricing Model taught in business schools is predicated on the assumption that treasury bills (the risk free asset) are, by definition, not correlated with any other asset, and, by definition 'risk free'. It is quite likely that the perception of these assumptions, or possibly the assumptions themselves, end up being proven false in coming years. I drew the 'Peak Oil' CAPM to illustrate lower expected return, and higher expected risk across the board for tertiary market assets.



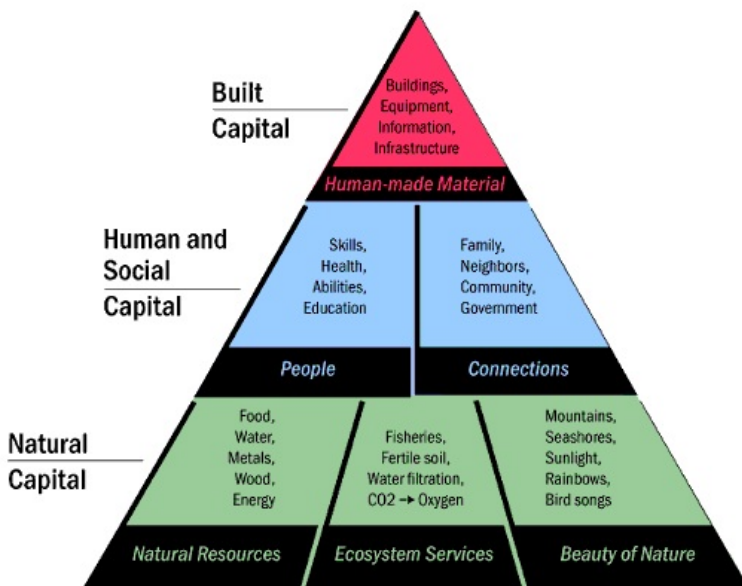
Ronald Inglehart of the World Values Survey verbalized the above graph by stating that after meeting basic needs, lifestyle choices make up the majority of the difference in the [GNP spectrum](#), and lower energy lifestyles do just about as well as high energy lifestyles (indeed, the [USA uses 38 times the primary energy of the Phillipines](#) but gets equivalent rankings of 'very happy' - any of you that have lived or worked abroad will intuit this).



A Future Interpretation of the Capital Asset Pricing Model, incorporating Natural Capital,

As such the Capital Asset Pricing Model, the foundation of modern finance, can only remain a valid model if it is reapplied with wider non-financial boundaries: substituting natural, built, human and social capital for the tertiary financial markers of stocks, bonds, commodities, and cash. The risk free rate in such a model would be 'basic needs' (food, water, shelter, companionship, meaning, etc.)

Above this level (*which I marked in yellow because it is NOT risk free in reality, but still could be acquired with little risk to an individual), one would gradually increase their risk adjusted return (in an evolutionary sense), by having a well diversified portfolio during their life made up of reasonably equal proportions of built, human/social, and natural capital, only then supplemented by financial. As a social species that implicitly values rank, we will never all be equal, and our makeup virtually guarantees we will continue to compete for status. But channeling our penchant for competition towards the human and social capital areas will be better for us and better for our planet than competing for natural or built capital (3). Still, we will need those things as a foundation for our basic needs, and a springboard for higher pursuits. *The main takeaway here is not a formal model but for folks to think beyond digits/finance in measuring their own, and our planets 'wealth'.*



The Four (non-financial) Capitals ([description](#))

There is going to be an upheaval in our social structure in the intermediate (and possibly near) term future. It will not entirely invert, as many of those near the top got there due to skill, smarts and ambition, and if the rules change, they will quickly adapt, and these attributes will in relatively quick order reshuffle them to the top. The point however, is that post peak oil/credit, piles of financial wealth may not represent the free pass to the upper social crust they have the past few generations:

- a) there is a non-zero possibility of a debt jubilee, new currency, or financial reset where fortunes could literally disappear overnight,
- b) in a world that eventually must move away from increased specialization, globalization, and efficiency, and more towards local/regional scale, redundancy, and resiliency, the forward thinking human will need to diversify beyond financial assets, and into a portfolio of real capital.

It stands to reason the more uncertain the future becomes, the more one will need uncorrelated assets for proper diversification. Financial capital in reality has *always* just been one part of an individuals broader asset allocation - this fact is just likely to be more publicly intuited even if the financial academy doesn't acknowledge their methods measuring risk and wealth are broken. Individuals, neighborhoods, cities, regions, and countries that recognize this trend earlier will likely have advantages. After all, we are animals seeking the best *perceived* risk adjusted reward. On that, the safest advice I can give Pat, or anyone how to increase their wealth is an idea borrowed from Buddhist philosophy - reduce the *denominator* in the equation $Wealth = Assets/Desires$. This is possibly the only strategy that will increase ones wealth in virtually all future scenarios.

Lastly, however, our perception of wealth utilizes neural reward pathways linked with wanting, not having. Therefore, irrespective of how we change our cultural definition of wealth, as individuals we will still *want* more of whatever wealth is than our conspecifics. Only when some unknown majority of people realize their own wealth will suffer if we continue to compete for finite resources, will the Tragedy of the Commons problem start to resolve. Barring such a cultural transformation, we'll continue in a series of socio-economic boom-busts where the striving for the upper levels draws down our collective primary wealth. That's a lot of risk for a species.

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CAMPFIRE QUESTIONS:

- 1) How many of you experience similar feelings with respect to investments as Pat does?
- 2) Will monetary wealth hold its value to the next generation?
- 3) How can people that understand the implications above most effectively move more towards a portfolio of natural, social, built and human capital when we all still live in a culture that sends strong cues favoring financial (marker) capital?
- 4) Will we ever get social/media cues that frown upon excessive financial wealth, but instead laud men and women with skills, knowledge and generosity? If so, would you give up/allocate some of your money to increase your standing in these other areas?
- 5) Natural capital, other than land with water, trees, soil etc. can't be directly 'owned' other than by all of us. How would a change in values towards real capital accelerate awareness of the public commons?
- 6) Other.

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(1) In 2004, Americans consumed about 342,700,000 [3.4e8] Btu per capita, per year. [<http://www.eia.doe.gov/pub/international/iealf/tablee1c.xls>] This converts to about 86,358,951 [8.6e7 nutritional] calories per year [<http://www.onlineconversion.com/energy.htm>] or 86,358,951 / 365 = 236,599 [2.37e5 nutritional] calories per day. But humans only require something like 3,000 [nutritional] calories [of food energy] per day to survive, so it seems we (very roughly) use something like 235,000 [2.35e5 nutritional] calories per day, per capita for non-nutritional purposes. (Hat tip TOD reader Jay)

(2) The value of natural capital, 12 years ago, was estimated at [\\$33 trillion per year](#) (not valued by the market).

(3) The value of built capital can be estimated/aggregated via an [energy database](#). A Primer on [Emergy Analysis](#) from the EPA.



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